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USSN 09/726,395

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (*Previously presented*) A digital camera configured to obtain an image of a document, said camera comprising:

a first light source for illuminating said document in a first image capture operation of said camera;

a second light source for illuminating said document in a second image capture operation of said camera;

an imaging detector for capturing an image of said document from said first and second image capture operations, said imaging detector being arranged in first and second portions;

a controller for controlling said imaging detector, said controller being configured to collect an image of only a first portion of said illuminated document during said first image capture operation thereby providing first image data, and to collect an image of only a second portion of said illuminated document during said second image capture operation thereby providing second image data;

a memory for storing said first and second image data; and

a processor for processing said first and second image data so as to obtain a final image data of said document produced from said first and second image data.

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2. (*Currently amended*) A digital camera configured to obtain an image of a document, said camera comprising:

a first light source for illuminating said document in a first image capture operation of said camera;

a second light source for illuminating said document in a second image capture operation of said camera;

an imaging detector for capturing an image of said document from said first and second image capture operations, said imaging detector being arranged in first and second portions;

a controller for controlling said imaging detector, said controller being configured to collect an image of a first portion of said illuminated document during said first image capture operation thereby providing first image data, and to collect an image of a second portion of said illuminated document during said second image capture operation thereby providing second image data;

a memory for storing said first and second image data; and

a processor for processing said first and second image data so as to obtain a final image data of said document produced from said first and second image data;

wherein the light sources and the imaging detector are adapted such that the first portion of said illuminated document does not contain a reflected image of the first light source during the first image capture operation and the second portion of said illuminated document does not contain a reflected

image of the second light source during the second capture operation.

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3. (*Original*) A digital camera as claimed in claim 1, wherein said first portion of said imaging detector and said second portion of said imaging detector constitute part of an integrated image sensing unit, said unit further comprising a first portion of said memory and a second portion of said memory.

4. (*Original*) A digital camera as claimed in claim 1, wherein said first portion of said imaging detector is coupled to a portion of said memory specifically allocated to said first imaging detector portion.

5. (*Original*) A digital camera as claimed in claim 1, wherein said camera is configured to capture substantially half of said document image in said first image capture operation and capture substantially half of said document image in said second image capture operation.

6. (*Original*) A digital camera as claimed in claim 1, comprising at least one lens wherein illumination from said illuminated document passes through at least one lens prior to being received by said imaging detector.

7. (*Original*) A digital camera as claimed in claim 6, wherein said imaging detector is positioned substantially above said at least one lens.

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8. *(Previously presented)* A digital camera as claimed in claim 1, wherein:

said imaging detector comprises an array of light sensitive elements arranged for exposure to illumination from said documents;

said controller comprises an array of gates for gating charge collected by said array of light sensitive elements; and

said memory comprises an array of charge storage elements arranged to receive a plurality of charges from said array of light sensitive elements, via said gates.

9. *(Original)* A digital camera as claimed in claim 8, wherein:

said imaging detector comprises:

an array of individual image sensing elements;

said controller comprises an array of individual control elements; and

said memory comprises an array of individual storage elements, wherein

each said image sensing element has a corresponding respective said control element and a corresponding respective said storage element, the arrangement being that each said image sensing element accumulates charge in response to illumination, and said charge is controlled by said corresponding respective control element to be supplied to said corresponding respective storage element, or to be discharged from said image sensing element other than to said storage element.

10. *(Original)* A digital camera as claimed in claim 1, wherein said portions of said imaging detector are configurable for use independently.

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11. *(Original)* A digital camera as claimed in claim 1, wherein said controller is substantially integrated with said imaging detector, said memory, and said first and second light sources.

12. *(Original)* A digital camera as claimed in claim 1, comprising a camera stand for enabling said camera to be maintained in a fixed position above said document.

13. *(Original)* A digital camera as claimed in claim 1, wherein said controller is configurable for use in producing a predetermined delay between said first image capture operation and said second image capture operation.

14. *(Original)* A digital camera as claimed in claim 1, wherein said controller is configurable for use in producing a said first illumination of said document and a said second illumination of said document consecutively, one after the other.

15. *(Original)* A digital camera as claimed in claim 1, wherein said imaging detector is integrated directly to a storage unit or memory bank of the camera.

16. *(Original)* A digital camera as claimed in claim 1, wherein said first light source and said second light source are positioned diametrically opposite each other on a circle, and comprising at least one lens positioned at the centre of said circle.

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17. (Previously presented) A method of obtaining an image of a document using a digital camera, said method comprising the steps of:

illuminating the document in a first image capture operation of said camera;

illuminating the document in a second image capture operation of said camera;

using an imaging detector to capture an image of said document from said image capture operations;

during said image capture, controlling said imaging detector in accordance with the steps of:

exposing only a first portion of said imaging detector to said ~~eliminated~~ illuminated document during a first image capture operation to provide first image data;

exposing only a second portion of said imaging detector to said ~~eliminated~~ illuminated document during a second image capture operation to provide second image data;

storing said first and second image data; and

processing said first and second image data so as to obtain a final image of said document produced from said first and second image data.

18. (Currently amended) A method of obtaining an image of a document using a digital camera, said method comprising the steps of:

illuminating the document in a first image capture operation of said camera;

illuminating the document in a second image capture operation of said camera;

using an imaging detector to capture an image of said document from said image capture operations;

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during said image capture, controlling said imaging detector in accordance with the steps of:

exposing a first portion of said imaging detector to said illuminated document during a first image capture operation to provide first image data;

exposing a second portion of said imaging detector to said illuminated document during a second image capture operation to provide second image data;

the first and second image capture operations including illuminating the exposed first and second portions by using first and second light sources, respectively;

storing said first and second image data; and

processing said first and second image data so as to obtain a final image of said document produced from said first and second image data;

wherein during said first image capture operation the first portion does not contain an image of the first light source, and during said second image capture operation the second portion does not contain an image of the second light source.

19. *(Previously presented)* A method as claimed in claim 17, wherein during said step of image capture, controlling said sensing means comprises the steps of:

exposing a first portion and a second portion of the imaging detector to said illuminated document during said first image capture operation, said first image capture operation thereby resulting in a first image;

exposing said second portion and a third portion of said imaging detector to said illuminated document during said second image capture operation, said second image capture operation thereby resulting in a second image, said first and second image

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capture operations resulting in a third image;

storing said first, second and third images; and

processing said first and second images so as to obtain a final image of said document.

20. (Previously presented) A method as claimed in claim 19 further comprising the steps of:

following said first image capture operation, transferring said first image from said first portion of the imaging detector to a suitable first memory; and

following said second image capture operation, transferring said second image from said second portion of the imaging detector to a suitable second memory.

21. (Currently amended) A method of obtaining an image of a document using a digital camera, said method comprising the steps of:

illuminating the document in a first image capture operation of said camera;

illuminating the document in a second image capture operation of said camera;

using an imaging detector to capture an image of said document from said image capture operations;

during said image capture, controlling said imaging detector in accordance with the steps of:

exposing a first portion of said imaging detector to said ~~eliminated~~ illuminated document during a first image capture operation to provide first image data;

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exposing a second portion of said imaging detector to said ~~eliminated~~ illuminated document during a second image capture operation to provide second image data;

the first and second image capture operations including illuminating the exposed first and second portions by using first and second light sources, respectively;

storing said first and second image data;

processing said first and second image data so as to obtain a final image of said document produced from said first and second image data

during said step of image capture, controlling said sensing means by:

(a) exposing a first portion and a second portion of the imaging detector to said illuminated document during said first image capture operation said first image capture operation thereby resulting in a first image;

(b) exposing said second portion and a third portion of said imaging detector to said illuminated document during said second image capture operation said second image capture operation thereby resulting in a second image, said first and second image capture operations resulting in a third image;

(c) storing said first, second and third images; and

(d) processing said first and second images so as to obtain a final image of said document

following said first image capture operation, transferring said first image from said first portion of the imaging detector to a suitable first storage means;

following said second image capture operation, transferring said second image from said second portion of the imaging detector to a suitable second storage means;

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transferring said third image from said third portion of said sensing means to a suitable third storage means; and

processing said first, second and third images so as to obtain a final image of said document.

22. (Original) A digital imaging apparatus configured to obtain an image of a document, said imaging apparatus comprising a digital camera and a stand adapted to hold said digital camera in a fixed orientation relative to said document, said digital camera comprising:

a first light source for illuminating said document in a first image capture operation;

an imaging detector for capturing an image of said document from said first image capture operation and a second image capture operation, said imaging detector being arranged in first and second portions;

a controller for controlling said imaging detector, said controller being configured to collect an image of a first portion of said illuminated document during said first image capture operation, said first image capture operation thereby resulting in a first image data, and said control means being configured to collect an image of a second portion of said illuminated document during said second image capture operation, said second image capture operation thereby resulting in a second image data;

a memory for storing said first and second image data; and

a processor for processing said first and second image data so as to obtain a final image data of said document produced from said first and second image data;

said stand comprising:

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a second light source for illuminating said document in said second image capture operation,

wherein said controller is arranged to activate said first and second light sources for illumination of said first and second imaging detector portions.

23. (Original) A digital imaging apparatus as claimed in claim 22, wherein the light sources and the imaging detector are adapted such that the first portion does not contain a reflected image of the first light source and the second portion does not contain a reflected image of the second light source.

24. (Currently amended) A method of capturing an image comprising sequentially illuminating the image with optical energy from first and second directions, the image responding to the illumination by reflecting the image, detecting only a first portion of the reflected image at a first image sensing region in response to the image being illuminated from the first direction, detecting only a second portion of the reflected image at a second image sensing region in response to the image being illuminated from the second direction, the first and second image sensing regions differing from each other, and combining the detected first and second reflected image portions so the combined first and second reflected image portions are in substantially the same spatial relationship as the image,

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the first and second directions and the first and second image sensing regions and the combining step being such that specular reflection from the image is not present in the combined image.

25. (Previously presented) The method of claim 24 wherein the first and second image sensing regions are on opposite sides of an optical axis intersecting the image and the first and second directions are on opposite sides of the optical axis,

the detecting step of only the first portion of the reflected image being performed only while the image is illuminated from the first direction,

the detecting step of only the second portion of the reflected image being performed only while the image is illuminated from the second direction.

26. (Previously presented) The method of claim 25 wherein the first and second image sensing regions include optical to electric transducers and the combining step is performed by transferring to a memory electric energy derived only by the electric transducers of the first image sensing region in response to reflected optical energy of the image being incident on the first image sensing region and by transferring to the memory electric energy derived only by the electric transducers of the second image sensing region in response to reflected optical energy of the image being incident on the second image sensing region.

27. (Previously presented) The method of claim 24 wherein the first and second image sensing regions include optical to electric transducers and the combining step is

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performed by transferring to a memory electric energy derived only by the electric transducers of the first image sensing region in response to reflected optical energy of the image being incident on the first image sensing region and by transferring to the memory electric energy derived only by the electric transducers of the second image sensing region in response to reflected optical energy of the image being incident on the second image sensing region.

28. (*Previously presented*) The method of claim 27 wherein the electric energy is transferred to the memory by controlling, in response to the optical energy incident on the optical to electric transducers, charge on first charge storage elements respectively associated with the optical to electric transducers, and then controlling, in response to the charge on the first charge storage elements, charge on second charge storage elements respectively associated with the first charge storage elements.

29. (*Previously presented*) The method of claim 27 wherein the electric energy is transferred to the memory by controlling, in response to the optical energy incident on the optical to electric transducers, charge on charge storage elements respectively associated with the optical to electric transducers.

30. (*Previously presented*) Apparatus for capturing an image comprising
an optical energy source arrangement for sequentially illuminating the image with optical energy from first and second directions,
first and second image sensing regions at different locations,

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a controller for causing (a) only the first image sensing region to be adapted to detect a first portion of the reflected image in response to the image being illuminated from the first direction and (b) only the second image sensing region to be adapted to detect a second portion of the reflected image in response to the image being illuminated from the second direction, and

a combiner for the images adapted to be detected by the first and second image sensing regions, the combiner being arranged so the combined image from the first and second image sensing regions are in substantially the same spatial relationship as the image,

the first and second directions and the first and second image sensing regions and the combiner being such that specular reflection from the image is not present in the combined image.

31. *(Previously presented)* The apparatus of claim 30 wherein the optical energy source arrangement includes first and second optical sources located on opposite sides of the first and second image sensing regions.

32. *(Previously presented)* The apparatus of claim 31 wherein the first and second image sensing regions have abutting edges and the first and second optical sources are equally spaced from the abutting edges.

33. *(Previously presented)* The apparatus of claim 32 further including a lens having an optical axis intersecting the abutting edges so that the first and second image

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sensing regions are respectively on first and second opposite sides of the optical axis, the first and second optical sources being respectively on the first and second opposite sides of the optical axis.

34. (*Previously presented*) The apparatus of claim 33 wherein the controller is arranged for preventing detection of the second portion of the detected image by the image sensing region on the first side of the optical axis and for preventing detection of the first portion of the detected image by the image sensing region on the second side of the optical axis.

35. (*Previously presented*) The apparatus of claim 30 wherein the first and second image sensing regions are respectively on first and second opposite sides of an optical axis, the first and second optical sources being respectively on the first and second opposite sides of the optical axis, the controller being arranged for preventing detection of the second portion of the detected image by the image sensing region on the first side of the optical axis and for preventing detection of the first portion of the detected image by the image sensing region on the second side of the optical axis.

36. (*Previously presented*) The apparatus of claim 35 wherein the first and second image sensing regions include optical to electric transducers and the combiner includes a memory for storing electric energy derived (a) in response to electric signals derived only by the electric transducers of the first image sensing region being responsive to reflected optical energy of the image incident on the first image sensing

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region and (b) in response to electric signals derived only by the electric transducers of the second image sensing region being responsive to reflected optical energy of the image incident on the second image sensing region.

37. (*Previously presented*) The apparatus of claim 30 wherein the first and second image sensing regions include optical to electric transducers and the combiner includes a memory, the controller being arranged for transferring to the memory electric energy derived only by the electric transducers of the first image sensing region in response to reflected optical energy of the image being incident on the first image sensing region and by transferring to the memory electric energy derived only by the electric transducers of the second image sensing region in response to reflected optical energy of the image being incident on the second image sensing region.

38. (*Previously*) The apparatus of claim 37 wherein the controller includes first and second charge storage elements, the first charge storage elements being respectively associated with the optical to electric transducers, the optical to electric transducers being coupled with the first charge storage elements for causing the optical energy incident on the optical to electric transducers to control the charge stored on the first charge storage elements, the second charge storage elements being respectively associated with the first charge storage elements, the first charge storage elements being coupled with the second charge storage elements for causing the charge stored on the first charge storage elements to control the charge stored on the second charge storage elements.

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39. *(Previously presented)* The apparatus of claim 37 wherein the controller includes charge storage elements, the charge storage elements being respectively associated with the optical to electric transducers, the optical to electric transducers being coupled with the charge storage elements for causing the optical energy incident on the optical to electric transducers to control the charge stored on the charge storage elements.

40. *(Previously presented)* Apparatus for capturing an image, the apparatus comprising

an optical axis,

a first image sensing region only on a first side of the optical axis,

a second sensing region only on a second side of the optical axis,

first and second optical sources for sequentially illuminating the image and causing derivation of first and second reflected images in response to activation of the apparatus, the first and second optical sources being respectively located on the first and second sides of the optical axis,

a controller for enabling (a) only the first sensing region to be responsive to the reflected image adapted to be derived in response to the first optical source being activated and (b) only the second sensing region to be responsive to the reflected image adapted to be derived in response to the second optical source being activated, and

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a combiner for the images adapted to be detected by the first and second image sensing regions, the combiner being arranged so the combined image from the first and second image sensing regions are in substantially the same spatial relationship as the image.

41. *(Previously presented)* The apparatus of claim 40 wherein the first and second image sensing regions have abutting edges coincident with the optical axis and the first and second optical sources are equally spaced from the abutting edges.

42. *(Previously presented)* The apparatus of claim 40 wherein the first and second image sensing regions include optical to electric transducers and the combiner includes a memory for storing electric energy derived (a) in response to electric signals derived only by the electric transducers of the first image sensing region being responsive to reflected optical energy of the image incident on the first image sensing region and (b) in response to electric signals derived only by the electric transducers of the second image sensing region being responsive to reflected optical energy of the image incident on the second image sensing region.

43. *(Previously presented)* The apparatus of claim 42 wherein the controller includes first and second charge storage elements, the first charge storage elements being respectively associated with the optical to electric transducers, the optical to electric transducers being coupled with the first charge storage elements for causing the optical energy incident on the optical to electric transducers to control the charge stored

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on the first charge storage elements, the second charge storage elements being respectively associated with the first charge storage elements, the first charge storage elements being coupled with the second charge storage elements for causing the charge stored on the first charge storage elements to control the charge stored on the second charge storage elements.

44. (*Previously presented*) The apparatus of claim 42 wherein the controller includes charge storage elements, the charge storage elements being respectively associated with the optical to electric transducers, the optical to electric transducers being coupled with the charge storage elements for causing the optical energy incident on the optical to electric transducers to control the charge stored on the charge storage elements.